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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/450,351

11/29/99

YAMAMOTO

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SHM-00901

MMC2/1101

PATENT GROUP

HUTCHINS, WHEELER & DITTMAR

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BOSTON MA 02110

EXAMINER

TSAI, H

ART UNIT

PAPER NUMBER

2812

DATE MAILED:

11/01/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
**09/450,351**

Applicant(s)  
**Yamamoto**

Examiner  
**H, Jey Tsai**

Group Art Unit  
**2812**



☐ Responsive to communication(s) filed on \_\_\_\_\_.

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-20 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-20 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4, 6

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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*Claim Rejections - 35 U.S.C. § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa 6,087,261 in view of Tamaru et al. 6,103,566 and Lee et al. 6,010,940.

The reference(s) teach the features :

Nishikawa substantially discloses a method of forming a capacitor on the semiconductor device, which includes :

forming a tantalum oxide dielectric layer 5, fig. 4B,

treating substrate in the chamber with at least one of a gas containing non-reactive  $\text{NH}_3$  and helium gases flow, col. 9, lines 1+,

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heating the substrate in the  $\text{NH}_3$  ambient at about 0.15 torr,  
fig. 6, col. 9, lines 30+,

introducing the source gas containing a high melting point  
metal  $\text{TiCl}_4$  to form TiN layer 6.

The difference between the reference(s) and the claims are  
as follows:

Nishikawa et al. teaches using helium as inert gas.  
However, Tamaru et al. teaches using nitrogen gas during the heat  
treatment process, before introducing  $\text{NH}_3$ , then forming metal  
nitride with high melting metal containing gas in col. 18, lines  
27+ and col. 16, lines 20. And, Lee teaches annealing the  
substrate with  $\text{NH}_3$  after forming TiN.

It would have been obvious to one having ordinary skill in  
the art at the time the invention was made to have modified  
Nishikawa et al.'s process with nitrogen gas to stabilize the  
tantalum oxide with heat treating step as suggested by Tamaru et  
al. because nitrogen does not reoxidize the tantalum oxide.

Any inquiry of a general nature or clerical matters or  
relating to the status of this application or proceeding should  
be directed to the Group customer service whose telephone number

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is (703) 306-3329 and Fax number (703) 306-5515. Group  
receptionist telephone number 703-308-0956.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (703) 308-1374. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone number for this Group is (703) 305-3431.

hjt  
10/23/0



H. Jey Tsai  
Primary Examiner  
Patent Examining Group 2800